

REMARKS

In the Office Action, claims 1, 3, 4 and 7-20 were rejected. By this Response, claims 1, 3 and 4 have been canceled, and claims 7, 9, 10, 11, 13, 14, 19 and 20 have been amended. Upon entry of the amendments, claims 7-20 will be pending in the present patent application. Reconsideration and allowance of all pending claims are requested.

Claim Objections

Claims 9, 10 and 11-19 were objected to because of informalities, such as minor drafting errors including grammatical and/or lack of antecedent basis issues. Applicants have amended claims 9, 10, 11, 13, 14 and 19 to overcome the objections. Accordingly, Applicants request that the Examiner reconsider and remove the objections.

Rejections Under 35 U.S.C. § 103

Claims 1 and 3 were rejected under 35 U.S.C. § 103(a) as being unpatentable over “An Iterative Maximum-Likelihood Polychromatic Algorithm for CT” (hereinafter, “De Man”) in view of U.S. Patent No. 5,848,115 (hereinafter, “Little”).

Claim 4 was rejected under 35 U.S.C. § 103(a) as being unpatentable over De Man and Little as applied to claim 1, and further in view of “Maximum-likelihood x-ray computed-tomography finite beamwidth considerations” (hereinafter, “Browne”).

In response to the Office Action, Applicants have cancelled claims 1, 3 and 4 and their rejection is now moot.

Claims 7, 8, 10-12, 14-16 and 18-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over “Iterative Reconstruction for Metal Artifacts in Computed Tomography” (hereinafter, “De Man”) in view of “Bayesian Reconstruction of Functional Images Using Anatomical Information as Priors” (hereinafter, “Gindi”).

Applicants respectfully submit that De Man and Gindi, alone or in combination, do not teach, disclose or suggest all the features recited in independent claims 7, 11, 19 and 20. Specifically neither reference teaches, discloses or suggests constraining a reconstructed image *at each successive iteration* by utilizing prior outer edge information obtained from a modality in addition to CT. Accordingly, the combination of the references cannot possibly include these features of the claims, and thus cannot render the claims obvious.

Claims 7, 11, 19, 20 and claims depending therefrom

Gindi discloses a Bayesian method whereby maximum *a posteriori* (MAP) estimates of functional (PET and SPECT) images may be reconstructed with the aid of prior information derived from registered anatomical MR images.

However, the Bayesian method disclosed by Gindi is not equivalent or even similar to the technique for implementing an iterative reconstruction of a computed tomography (CT) image as recited in the pending claims. In accordance with the present patent application, the prior outer edge information is used to modify the current estimated reconstruction image, prior to calculating an updated sinogram for comparison with the measured sinogram. In other words, the multi-modal (prior outer edge) constraint information is used to adjust the outer edge information *in each iteration*. *See, e.g.*, Application, page 8, paragraph 28. More specifically, the outer edges from an intermediate reconstruction (iteration) are combined with the outer edge data obtained from another modality to result in an updated image. In each successive iteration, outer edges from the intermediate reconstruction are again adjusted by using the accurate outer edge information. *See, e.g.*, Application, page 8, paragraph 30.

There is no disclosure, teaching or even a suggestion in Gindi of a method for implementing an iterative reconstruction of a CT image, wherein the method comprises constraining the reconstructed image, *at each successive iteration*, by utilizing prior outer

edge information obtained from a modality in addition to CT. Applicants have carefully reviewed the section referenced by the Examiner (abstract), and submit that this section, and the reference as a whole, fails to disclose a method for constraining a reconstructed image *at each successive iteration* by utilizing prior outer edge information obtained from a modality in addition to CT. One skilled in the art would therefore conclude that Gindi appears *only* to disclose a Bayesian model that incorporates prior knowledge of correlated anatomical discontinuities into the reconstruction of functional images.

De Man similarly fails to teach this recited feature, and indeed, the Examiner did not rely upon De Man for teaching a method for constraining a reconstructed image *at each successive iteration* by utilizing prior outer edge information obtained from a modality in addition to CT. De Man discloses the use of iterative reconstruction techniques for the reduction of metal artifacts in computed tomography. More specifically, De Man discloses important causes of metal artifacts, and develops new algorithms for reduction of metal artifacts.

Consequently, no combination of the references could render such inventive features obvious. In view of the above-noted distinctions, Applicants submit that claims 7, 11, 19 and 20 are neither the same as, nor in any way taught or suggested by Gindi or De Man taken either singly or in combination.

In view of the foregoing deficiencies in the teachings of the prior art, the references cannot establish a *prima facie* case of obviousness of claims 7, 11, 19 and 20. Accordingly, these claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance are respectfully requested.

Dependent claims 8, 10, 12, 14-16 and 18 depend from presumably allowable independent claims 7 and 11. Accordingly, these claims are believed to be clearly

patentable over the cited combination. Their reconsideration and allowance are requested.

Claims 9 and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over De Man and Gindi as applied to claims 8 and 12 above, and further in view of Little. Claim 17 was rejected under 35 U.S.C. § 103(a) as being unpatentable over De Man and Gindi as applied to claim 11 above and in further view of Browne.

As summarized above, all of the independent claims are patentable over the combination of De Man in view of Gindi. The Little and Browne references have been reviewed with respect to the 35 U.S.C. § 103(a) rejection, but fail to obviate the deficiencies of De Man in view of Gindi in regards to a method for constraining a reconstructed image *at each successive iteration* by utilizing prior outer edge information obtained from a modality in addition to CT. Accordingly, claims 9, 13 and 17 are allowable by virtue of their dependency from allowable base claims 7 and 11. These claims are believed to be clearly patentable over the cited combination. Their reconsideration and allowance are requested.

Conclusion

In view of the remarks and amendments set forth above, Applicants respectfully request allowance of the pending claims. If the Examiner believes that a telephonic interview will help speed this application toward issuance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,

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